

Appendix B – Evaluation of Noise Mitigation Options

Appendix B

Evaluation of Noise Mitigation Options

B.1 Introduction

Following implementation of the noise abatement measures described in Appendix A, high levels of aircraft noise are still expected to occur over areas developed in noise-sensitive land uses. Noise mitigation measures are designed to mitigate aircraft noise exposure, i.e., reduce or minimize the number of people and the existing or planned noise-sensitive land uses exposed to significant aircraft noise.

This appendix describes several options for noise mitigation and provides an evaluation of their applicability to San Antonio International Airport and its environs and the results of the discussions with the Technical Advisory Committee (TAC) and the Aviation Department. The measures that were evaluated were (1) already considered for implementation or had been implemented in the Airport environs; (2) recommended for consideration by members of the TAC, the Noise Abatement Advisory Committee (NAAC), or the general public; (3) recommended for or successfully implemented in the environs of other air carrier airports; or (4) mandated for review by the FAA under FAR Part 150.

The mitigation measures are classified as:

- Remedial Measures—Intended to reduce or improve the compatibility of existing incompatible land uses.
- Preventive Measures—Intended to discourage the development of new incompatible land uses.

The categories of and specific options considered for the Airport are presented in **Table B-1**. The measures were presented to the TAC and discussed in general terms and those that were considered to have potential for providing noise mitigation relief and would be applicable within the City of San Antonio were considered in more detail. The specific options that were discussed in more detail and recommended are identified in Table B-1. Each mitigation measure was evaluated on the basis of the following criteria:

1. Does it reduce existing incompatible land uses or the population exposed to significant aircraft noise?
2. Does it prevent or discourage development of incompatible land uses or reduce the number of people potentially exposed to significant aircraft noise?
3. Is it consistent with the policies of the City of San Antonio Aviation Department?
4. Is it consistent with the policies of the affected local jurisdictions?
5. Would it have a positive effect on existing and planned land use patterns?
6. Can it be implemented under existing laws?
7. Is it economically, financially, and politically feasible?
8. Is it feasible for early implementation?

Table B-1**Noise Mitigation Options Considered for San Antonio International Airport**

Category	Noise mitigation options	Specific measures considered in detail
Remedial measures	Land acquisition	Not discussed in detail
	Transaction assistance programs	Not discussed in detail
	Acoustical treatment programs	Extension of the ongoing Residential Acoustical Treatment Pilot Program Addition of noise-sensitive facilities not currently considered
	Avigation easements	Included as part of Residential Acoustical Treatment Pilot Program
Preventative measures	Noise disclosure ordinance	Reconsideration of noise acknowledgement as part of real estate transactions
	Comprehensive planning	Comprehensive planning to protect noise corridors, particularly if the Runway 3 noise abatement corridor is implemented
	Zoning ordinances or zoning overlays	Zoning overlay

Source: Ricoondo & Associates, Inc.
Prepared by: Ricoondo & Associates, Inc.

To be recommended for a noise compatibility program, a measure should meet Criterion 1 or 2 above, but does not necessarily have to meet all of the other criteria. Criteria 3 through 8 provide a basis for establishing priorities when formulating a measure recommended for implementation.

In the following sections, the noise mitigation measures are described in general terms and are evaluated for their applicability to the San Antonio International Airport environs. The estimated effects of forecast noise levels on existing noise-sensitive land uses and population are based on the noise exposure map for 2004.

B.2 Remedial Measures

B.2.1 Land Acquisition

Acquisition of property in fee simple ownership, which involves the full purchase of land and the improvements thereon, and is the most direct means of achieving land use compatibility in an airport environs. The acquired property can be (1) used for airport purposes, (2) leased for aviation-related or airport-compatible uses, (3) resold with avigation easements and deed restrictions that would permit only compatible uses, (4) retained by the airport sponsor and maintained as permanent open space, or (5) used by other government agencies for compatible public purpose, such as storage yards and some types of parks.

Residential property acquisition programs can severely disrupt neighborhoods and can be very costly. Because noise exposure on residential uses other than mobile homes could be mitigated to some extent using acoustical treatment (in areas exposed to DNL 65 to 75), such acquisition programs are typically used only in locations exposed to severe aircraft noise (DNL 75 and higher), or in critical situations where other solutions are not feasible. Residential property acquisition programs should also be developed in consideration of the willingness of the affected residents to have their property acquired and be relocated.

The primary advantages of fee simple acquisition are that it:

- Eliminates land uses that are not compatible with aircraft noise and allows the development of only compatible uses.
- Enables the occupants of residences exposed to severe aircraft noise to be relocated to areas not affected by aircraft noise.
- Allows the airport sponsor to better control development in areas exposed to the highest levels of aircraft noise.

The primary disadvantages of a fee simple acquisition program involving single family housing—the type of land use most often acquired for noise compatibility purposes—are that such a program:

- Can be expensive and would require lengthy and costly relocation efforts.
- Often reduces the available supply of affordable housing in the airport environs.
- Can change the character of a neighborhood and disrupt local land use and traffic patterns.
- Could reduce property tax revenues by transferring land from private to public ownership.

In the environs of San Antonio International Airport, the noise-sensitive areas exposed to severe aircraft noise (DNL 75 and higher) are southeast of the Airport and north of Loop 410 and are developed in multi-family residential uses. There are single-family residential areas that are exposed to aircraft noise of DNL 70 to 75 southeast of the Airport and north and south of Loop 410. All of the single-family development is in established neighborhoods. The residents of the neighborhoods have generally expressed their desire to remain in those neighborhoods and have expressed concern that a land acquisition program would disrupt the neighborhood. Although the TAC and the Aviation Department recognize the problems associated with noise exposure in these areas, land acquisition was not considered a viable option. The areas that are exposed to the higher levels of aircraft noise would eventually be eligible for the residential acoustical treatment program.

B.2.2 Transaction Assistance Programs

Residential sales assistance assures owners of eligible residential property that their homes would be sold at least at fair market value if they decide to relocate because of noise. Such programs are most appropriate for single-family homes exposed to aircraft noise of DNL 70 and higher and can be structured as follows:

- Owners of homes exposed to DNL 70 to 75 would be given the opportunity to participate in lieu of some other noise mitigation measure such as acoustical treatment.
- If the owner wants to relocate because of aircraft noise, the airport sponsor pays for a property appraisal and the owner places the house on the market with an approved multiple listing realtor.

- If the home is not sold for a predetermined fair value within a specified time period, the airport sponsor can provide incentives to make the home more attractive to potential buyers.
- If the home is still not sold, the airport sponsor can acquire the property and resell it at a later date. To limit the financial risk, the airport sponsor would own no more than a specified number of homes at any given time.
- The airport sponsor would obtain an avigation easement on the property at the time of the resale.

Such a program would only be recommended for residential areas expected to remain in residential use. The advantages of a residential transaction assistance program are that it:

- Allows residents who are unhappy with the noise exposure in their homes to relocate to a quieter neighborhood.
- Assures area residents that their homes will be sold at fair market value.
- Protects the airport sponsor from noise-related lawsuits, if avigation easements are included in the program.
- Retains existing neighborhoods and protects the property tax base.

The disadvantages of such a program are that it:

- Involves significant administrative time and cost.
- Requires relocation assistance if federal funds are used.

The TAC and the Aviation Department agreed that such a program would not be desirable or feasible for San Antonio International Airport. As stated in Section B.2.1, residents of the neighborhoods that would potentially be eligible for the participation in the program are generally satisfied with the neighborhood and desire to remain and have concerns about any changes that could disrupt the neighborhood. The funds that would be expended to cover the potential administrative and other costs were considered to be more useful for other noise abatement and noise mitigation efforts.

B.2.3 Acoustical Treatment Programs

Acoustical treatment involves incorporating materials into or redesigning and replacing existing parts of a structure in order to reduce the transmission of aircraft noise through the structure. An airport sponsor can provide complete or partial acoustical treatment of structures developed in noise-sensitive uses, such as residences, schools, religious facilities, and hospitals. Acoustical treatment is usually provided in exchange for avigation easements.

Available methods of acoustical treatment include (1) sealing or weather-stripping windows, doors vents, and external openings; (2) replacing hollow-core doors with solid doors; (3) installing a central ventilation or air conditioning system; (4) installing acoustically treated ceiling and wall panels; (5) installing double-glazed windows; (6) eliminating windows and reducing the size or number of other openings; and (7) insulating entryways, attics, and crawl spaces. Ventilation systems are required if windows are sealed.

The sound insulation of structures in an airport environs is intended to achieve an interior noise level of DNL 45 or less in all habitable rooms or in rooms where the noise can be most disturbing, such as bedrooms. In most areas, standard home construction provides a noise level reduction (NLR) of 20

decibels. A NLR above 20 decibels typically requires that windows and doors be completely closed. Homes having standard construction that are exposed to aircraft noise of DNL 65 to 70 can probably provide an adequate NLR if the ventilation system allows the windows and doors to be kept closed. Homes exposed to higher aircraft noise usually require additional acoustical treatment. The same is typically true for other types of noise-sensitive facilities such as schools, religious facilities, libraries, and hospitals.

The effectiveness of acoustical treatment in a given structure depends on the type of construction, age of the structure, the direction the structure faces relative to the noise source, the number and sizes of windows and doors, and other factors. The advantages of an acoustical treatment program are that it can:

- Improve the quality of life for the occupants and other users of the structure;
- Provide aesthetic improvements to the home and increase its potential for sale; and
- Reduce energy consumption.

The disadvantages are that acoustical treatment:

- Does not reduce the noise levels outside the structure;
- Could increase property taxes by increasing the value of the structure; and
- Could increase utility costs if the treatment program includes installation of ventilation or an air conditioning system.

The City of San Antonio Aviation Department has completed the acoustical treatment of 10 schools, 19 religious facilities, 1 library, and 2 nursing homes since the completion of the original FAR Part 150 Noise Compatibility Study for the Airport. The success of the program has been noted both in terms of measured NLR and anecdotal evidence provided by occupants and users of the structures. The TAC and the Aviation Department agreed that the program should be continued to include any facilities that may not have been treated to date or to include any structure that may be affected if the preferential runway use program and the Runway 3 noise abatement departure corridor are implemented. Based on the 2004 noise exposure map, an additional 2 schools (including public schools, private schools, and daycare facilities), 1 religious facility, and 1 group care home may be eligible for acoustical treatment. Based on the costs of previous acoustical treatment projects, the estimated costs for acoustical treatment of the additional structures would be \$2,500,000.

The City of San Antonio Aviation Department is currently conducting a Residential Acoustical Treatment Pilot Program (RATPP) to determine and quantify the benefits that can be derived in terms of noise reduction in the interiors of homes, as well as to establish the anticipated costs for implementing residential acoustical treatment. Five homes in the Airport environs have been included in the pilot program, specifications have been developed, and construction was completed in the spring of 2001. Final documentation is being completed. The pilot program was approved as part of the original FAR Part 150 Noise Compatibility Program approved for the Airport in 1991. The results of the pilot program were positive, and the Aviation Department wishes to outline a program for an expanded residential acoustical treatment program.

The five homes included in the RATPP represented different construction types and styles in a variety of neighborhoods around the Airport. The intent of the program was to provide specific data regarding the costs and benefits of acoustical treatment for the different construction types in different areas around the Airport. The results provide a database of information useful to the

Aviation Department in developing a comprehensive residential acoustical program for the Airport environs. The Aviation Department will also use the results of the RATPP to determine the level of funding to be provided from federal or Aviation Department revenues.

Given the positive results of the program, the Aviation Department intends, as a first priority, to provide acoustical treatment for those homes exposed to aircraft noise of DNL 70 and higher, based on the 2004 noise exposure map. After acoustical treatment has been provided in those areas, the Aviation Department may decide to continue the residential acoustical treatment program into areas exposed to DNL 65 and higher. At that time, it is likely that a revised noise exposure map would be developed to indicate the areas anticipated to be exposed to DNL 65 and higher. The TAC agreed that this would be the best method for proceeding with the residential acoustical treatment program.

As discussed in Section II of the Noise Compatibility Program Report, a potential preferential runway use program and a potential departure corridor for Runway 3 departures would be tested to determine their potential benefit and feasibility for implementation. Even if those measures are implemented, the areas exposed to DNL 70 and higher, based on the 2004 preliminary noise exposure map, would be still be exposed to aircraft noise of DNL 65 and higher and would therefore be eligible for the next phase of the acoustical treatment program, with partial funding from the FAA. About 407 homes were within these first priority eligibility boundaries. It is anticipated that the majority of the homes were constructed or approved for construction prior to October 1, 1998¹, and would therefore be eligible for partial federal funding for acoustical treatment. In some areas, although established neighborhoods have existed for many years, infill development and in some cases demolition and reconstruction of new homes has occurred. Construction dates and determination of eligibility of individual residences, along with program boundaries, would be reviewed as part of the development of the Residential Acoustical Treatment Program at the conclusion of the pilot program. The estimated cost of the first priority area is \$11,700,000, based on an average of \$25,000 per home for construction plus 15% design and contingency. Other implications of the Program will be addressed in the results of the Pilot Program.

B.2.4 Avigation Easements

Purchase of an avigation easement or providing noise mitigation such as acoustical treatment in return for an avigation easement compensates a property owner for (1) granting the airport sponsor the right for aircraft operations to be performed over the property and the associated noise, vibration, or other effects, and/or (2) accepting restrictions on more intensive use or further development of the property. Easements are permanent and enforceable through the civil courts, and the airport sponsor holds the title to the easement until the easement is sold or released. The easement is usually made a part of the deed and held in perpetuity with the property. In some states, noise-sensitive properties coved by avigation easements are considered to be compatible with airport operations.

Avigation easements can be obtained through negotiated purchase, as part of another mitigation measure, or by condemnation of the property rights involved. The cost of an easement obtained through airport sponsor-initiated condemnation proceedings is often lower than a negotiated purchase, but the condemnation process often generates ill will in the community.

¹ Homes constructed or approved for construction after October 1, 1998 are not eligible for acoustical treatment funding under *FAA 14 CFR Part 150, Final Policy on Part 150 Approval of Noise Mitigation Measures, Effect on the Use of Federal Grants for Noise Mitigation Projects*, October 1, 1998.

Avigation easements do not in themselves reduce noise exposure. However, easements can provide monetary or other compensation where other remedies are not feasible. In addition, avigation easements maintain existing neighborhoods and keep private property on the tax rolls.

The Aviation Department has included avigation easements as part of the acoustical treatment program for churches, schools, nursing homes and libraries, and as part of the RATPP. The homeowners that are participating in the pilot program have granted easements to the Aviation Department in return for having their home acoustically treated. Several members of the TAC and the NAAC expressed concern that such easements take away the rights of the property owners to seek further compensation or other mitigation for noise in the future. At this time, the easements are still included for the homes selected for participation in the RATPP and it is anticipated that some form of easement will be required as part of the full treatment program. Based on the concerns expressed by members of the TAC and the NAAC, the outright purchase of easements was not considered feasible for San Antonio International Airport.

B.3 Preventive Measures

B.3.1 Noise Disclosure Ordinance

Noise disclosure allows a prospective buyer of residential property to be made aware of the aircraft noise levels expected at the particular location, and of any local requirements for acoustical treatment. Fair disclosure of this information can be required directly through an ordinance or in the subdivision regulations covering the sale or transfer of property.

Developers and current homeowners may object to fair disclosure requirements on the grounds that they may depress property values. Thus, the effectiveness of fair disclosure requirements largely depends on the strength of the applicable ordinance or regulation, and on the community's willingness to enforce it.

Such an ordinance in itself does not reduce noise exposure nor does it reduce the number of people exposed to aircraft noise. However, it does ensure that homebuyers are aware of the noise exposure environment and can include that knowledge in their decision-making process. Therefore, people who move into the areas with noise exposure are less likely to be negatively affected by that noise, because they were aware of the situation when they purchased their home. This type of information is especially helpful to people moving into the community who may not be aware of flight patterns at the airport.

Such an ordinance was recommended as part of the original FAR Part 150 Noise Compatibility Study for San Antonio International Airport. The measure was never brought forth for approval by the City Council, however. The primary reasons were those discussed in the preceding paragraph with respect to concerns over potential effects on property values as well as the potential effects on the ability to sell certain properties.

The TAC and the Aviation Department agreed however that it is important that prospective homebuyers be aware of the noise exposure environment prior to the purchase of a home. It was also noted that although the majority of the real estate community was forthcoming about such information some agents were not as likely to alert homebuyers of the potential noise exposure in areas around the Airport. Although concern exists regarding effects on home values, on the ability to sell homes, and on the methods that could be used to implement and enforce such measures, the TAC

decided that it would be worthwhile to further pursue a mechanism for acknowledgement of noise exposure as part of real estate transactions. While a mandatory disclosure program (enacted through ordinance or other legal means) may not be possible, a voluntary disclosure program could provide some means of informing potential homebuyers of the extent of aircraft noise exposure in the environs of San Antonio International Airport

B.3.2 Comprehensive Planning

Comprehensive planning for an airport environs is a coordinated effort intended to ensure that airport operations are compatible with the needs of the airport environs and the region. Ideally, such planning results in recommendations that can permit the long-term development of the airport while protecting people in the environs from the adverse environmental effects of airport development and operations.

One technique that can be used in comprehensive planning for an airport environs is urban growth management, a process whereby decisions about where and when to provide sewers, roads, and other municipal services are made so as to encourage urban growth in areas and land uses that are compatible with airport development and operations. Urban growth management is not intended to prevent growth, but to avoid development that might be incompatible with airport operations. Such planning is most applicable to undeveloped or sparsely developed areas near an existing airport and can be used to protect flight corridors to and from the airport to prevent the future development of incompatible land uses.

To be effective, comprehensive planning should involve all of the jurisdictions in the airport environs. The comprehensive plan(s) should be formally adopted by the affected jurisdictions so that development decisions are made in accordance with the plan(s). In addition, the plan(s) should be specific enough to serve as a practical guide to development.

Comprehensive planning was included as a measure in the original FAR Part 150 Noise Compatibility Program for the Airport and the Aviation Department intend to continue to work with the City of San Antonio to develop some means of comprehensive planning as a follow-on to this study. The TAC and the Aviation Department agreed that it was also important to use planning or other mechanisms to protect the corridor of compatible land northeast of the Airport and east of Wetmore Road.

B.3.3 Zoning Ordinances or Zoning Overlays

A zoning overlay is a form of zoning that applies certain restrictions such as structure height allowances, type of structure constructed, and other limitations on a specific area without rezoning each parcel within the overlay zone. The allowed uses on land within an overlay zone would be those that conform to the underlying zoning as well as the overlay zoning requirements. Most jurisdictions include some form of height overlay zones to prevent structure from being built that would be obstructions or hazards to aircraft operations. Noise overlay zones can be used to limit the types of land uses that are allowed and to specify certain building requirements (such as acoustical treatment) without changing the underlying zoning.

The Airport Sponsor and the municipal jurisdictions responsible for implementation and enforcement can determine the limits of the zoning overlay. Some jurisdictions use the DNL 65 contour that could result from the ultimate airport development, recognizing that as aviation activity increases, additional areas may be impacted by aircraft noise. Other jurisdictions use boundaries that are

composites of existing and future noise exposure contours that would represent the “worst case” of noise exposure in the airport environs.

The TAC and the Aviation Department agreed that it was also important to protect compatible land use and therefore to study a mechanism to create a noise overlay zone for the Airport. As a result of this study, the Aviation Department began discussions with representatives of the City Planning Department and the Zoning Commission in late summer 2000 to identify the requirements and the potential for establishing an overlay zone for the Airport. As a result of these discussions, Airport Awareness Zones were identified for the environs of San Antonio International and Stinson Municipal Airports. For San Antonio International Airport, the boundaries of the Awareness Zone generally coincide with the area exposed to DNL 60 and higher based on the 1998 Noise Exposure Map. Within these zones, all rezoning cases will be reviewed by the Aviation Department for land use compatibility and the Aviation Department will provide comments and recommendations to the Zoning Commission regarding each case it reviews. The San Antonio Zoning Commission officially enacted the Awareness Zones on March 20, 2001. While the Awareness Zones provide notification of zoning changes and require Aviation Department input, the Zones do not restrict development of incompatible land uses within the areas exposed to significant aircraft noise. The recommended land use planning study would identify mechanisms to enforce such controls.